TROUBLE SHOOTING

"Prove all things; hold fast that which is good." 1 Thessalonians 5:21

Often, I get in a bike that has been sitting for a number of months or years. This is not really repair, but restoration. Usually, you will know little to nothing of the bikes history. We also want to spend as little as possible on this bike until we know if the engine and all the gears work. Just shifting through the gears by hand is not good enough. Once you put power to it, the transmission can start to jump out of gear. You have got to prove to yourself that this thing will run, and run good. If it does, you will want to hold onto it.

Here are some thoughts on getting a none running bike, running. You will need to put a good fire extinguisher where it is real handy, because the things you are doing can spark, backfire, and burn. Check the oil level and if it is low add some. If it, the oil, looks white or funny colored. Drain it and put in fresh. If it's full and looks OK, don't worry about it. We will change it once we get the engine started. Now, take the old, dead battery out and connect a nice big, fully charged, car battery, to the correct cables (Plus to plus, minus to minus) with some big, thick, jumper cables. You really don't have to worry about having too big of battery. As long as the voltage is correct, the size of the battery makes little difference as long as it is big enough. The electrical parts will only draw the power they need. The battery will not force too much power on to things, just because it is big. The big thing to remember is to take the old, dead, battery totally out of the system. If you keep the old battery in the bike it will try to suck up the power from the fully charged battery. This can cause the old battery to explode. The odds of this happening are very low with a small motorcycle battery. In fact, I've never seen a small battery blow up, but I've sure seen bigger ones blow, and it's not a pretty sight. Don't take the chance. Take the old battery completely out of the system. It wouldn't hurt to have some baking soda and lots of water handy too.

If the engine uses a magneto ignition system, you will not need the battery. Most dirt bikes (Not all.) use a magneto type ignition. Most street bikes (Not all.) use a battery. Now kick the engine over or hit the starter button and turn the engine over. If it does not turn over, either the starter or starter gears are bad, transmission is stuck, or the engine is stuck. If the starter solenoid clicks, but the starter does not turn, check the charge of the battery. If the battery is fully charged, connect the positive jumper cable directly to the starter cable. That's the big, thick, cable going from the starter solenoid to the starter. When you make the connection, there will be a big spark and the starter should turn. If it does, the solenoid is bad. If nothing happens, the starter cable is broken or the starter is bad. Try connecting directly to the starter motor, if possible. If the starter turns, but the engine does not, the starter gears or starter clutch is bad. If the starter does not turn, either the starter is bad or the engine is stuck.

If the kick starter will not turn, try putting the engine in third or fourth gear, or even top gear, and pushing it. If the engine will then turn over the problem is in the starter gears. If it still will not turn over, pull the cover over the crankshaft flywheel end, and put a wrench on the nut or bolt on the end of the crank and try to turn the crankshaft, with the transmission in neutral. If it turns, the gears are stuck. If it still will not turn, the engine is well and truly stuck ! If the engine is stuck it means the rings and piston have rusted to the bore of the cylinder. If this has happened, put some penetrating oil in the

cylinder and let it set for a while. Maybe, even over night. If you can brake it loose, good ! But, you will still have to take the head and cylinder off and bore the cylinder oversize and put in a new piston and rings. See the Piston Page. If it is a four stroke engine, you will also need to check the valves, so see the Valves Page



Ok, it turns over, but does it have any compression? Take out the spark plug(s) and ground the plug wire leads to the engine. This is to prevent burning out parts of the ignition system. Screw in a compression tester gauge. Open the throttles wide open and crank the engine. If you don't have the throttles wide open, you will get a low reading. You are going to need at least 100 PSI (pounds per square inch). Depending on the compression ratio, you could have 150 to 170 PSI or even higher. I have seen engines run on as little as 65 PSI (an outboard) and I have had them NOT run on as high as 90 PSI (a chain saw with a pinched ring.) A down and dirty way of testing is to put your thumb over the spark plug hole and turn the engine over. No matter how hard you push your thumb down, the compression pressure should blow your thumb off. If you can hold the pressure with your thumb, there's not enough compression to start the engine.

If you have a four stroke engine, it's always worth while to check the valve clearance to see if one of the valves is tight and leaking compression. See the Valve Clearance Page. To figure out whether it's the rings or the valves try this. Lock the crank with a wrench, with the piston at TDC (Top-Dead-Center) and run some compressed air in through the spark plug hole. Make sure you have a good hold on the crankshaft wrench or the engine will spin, throwing the wrench off ! Now listen. If you hear air coming out at the carb or air cleaner, the intake valve is leaking. If at the exhaust pipe, it's the exhaust valve. If at the engine breather, it's the rings.

While the spark plugs are out, and we are cranking the engine over a lot, do it just a bit more. Do it till the engine oil light (if it has one) goes out, or until you feel that enough oil has been pumped to all parts of the engine. If you use the kick starter, kick it maybe, 30 times or so. If you use the electric starter, crank the starter no more than 10 to 15 seconds. Then let it sit and cool off for a minute. Motorcycle electric starters are very fragile and very expensive. If you crank away for a minute or two, the starter could be burned out.



So we find we have compression, what next? Check for spark. I like to use a new spark plug with the ground electrode bent straight out and a clip soldered in the side. Connect your tester to the big thick spark plug lead and crank the engine. You should see a nice big fat blue spark. If you don't, disconnect the engine kill button. If there still is no spark, you will need to determine if the engine has points or electronic ignition. Most (but not all.) bikes built before 1980 have points ignition. Most bikes built after 1980 (but not all.) have some sort of electronic ignition system. If in doubt, pull one of the crank end covers (Usually 2-3 screws) and look. If you have a battery and coil points system see the points page If you have a points magneto system see the Magneto page. If you have an electronic ignition system see the electronic ignition page.

Ok, we now have spark. If the old spark plugs are real clean you can use them, otherwise put in new ones. Put all the plugs back in the engine and connect up all the plug caps to the plugs. Check the air

cleaner and air box. Make sure mice or bugs haven't gotten in there and built a nest, plugging up everything. Look at the air cleaner. If it's a paper type, blow it off and use it until we are sure the bike will run and the gears work. Then get a new one. Paper tends to plug up, as it ages. If it's a foam one, clean it in solvent. As you clean it, rub the foam somewhat roughly. Not too roughly, just a little roughly. If the foam starts to come apart in your hands you will need to get a new air cleaner. A lot of bikes must have that air cleaner in the system. If you leave it out, the engine may run too lean. This, of course, makes you think there is something wrong with the carb. I had an old Suzuki GS750 come in once. If you just took the air cleaner cover off, it would refuse to idle. Put it back on and it idled perfect. The owner put over 60,000 miles on that bike. Ran great, but it had to have that air cleaner on. I've seen a number of different makes and models do the same thing. Sometimes, even a crack in the air box can make them run funny. I've also seen a lot of bikes where having the air cleaner on or off made no difference in their running. If your not sure, leave the air cleaner in place while you work on the engine.

Now drain the old gas out, put some new gas in the tank and turn the fuel petcock to "PRI" or "ON", and check that there is a flow of clean gas to the carbs. Tanks that are badly rusted will require a filter in the gas line to the carbs. If not see the Gas Tank Page. If the gas starts to come out the carb over flow tube(s) tap the carbs gently, but sharply with a plastic hammer or the plastic end of a screwdriver. Do this to each carb several times or until the gas over flow stops. If it does not stop you will have to take the carbs apart and find out why the fuel valve (needle and seat) is not working. See the Carb page. If it will not start, try to drain the fuel out of the carb with the float bowel drain screw. If nothing comes out, nothing is going in. In other words the needle and seat are stuck closed. Again, if tapping the carb doesn't start the gas flow, take the carb apart to find out why.

Check for water in the gas too. Water is heavier than gas, so the gas floats on top of the water. Drain some fuel into a glass container and look for water at the bottom. You can also take a cotton rag and catch some gas in it. Usually, the gas will soak into the rag, and the water will ball up on the surface of the rag.

If it just will not start, try putting an eyedropper's worth of fresh, good, (as in "Buy It New") gas down each carb. If the problem is only with the carbs, the engine should start, rev up, and die. Put in another eyedropper of gas, and it should do it again. You can do this even if the carbs are off the engine. Just put the gas down the intake port. Keep your finger on the kill button, in case it revs too high. If it doesn't start, DO NOT keep putting gas down the intake. If the raw gas works it's way into the exhaust pipe, it can vaporize there, EXPLODE, and blow your exhaust (and other things !) pipe clean off. You can use starting fluid or spray carb cleaner for this too. Just remember to use a LITTLE. Too much and it can blow things up, just like gas. If it still will not start, it means something else is (mechanical or electrical) wrong too. This will work for both two and four stroke engines.

If it starts with the choke, but will not idle with the choke off, check to see if the idle jet is plugged. If it will not idle, but seems to rev up, down, and then dies when you try to adjust the idle. You got an air leak in the carb manifold or gasket. If your ignition timing is way off or if the automatic spark advance is stuck. These things can cause erratic idling and strange running. If it starts and idles good, but loses that good idle as it warms up. Check the valve clearance. If a valve is just a bit tight, it can leak a bit after things warm up and expand. Once you know the engine will start and run, I would turn it off and change the oil and filter. You don't necessarily have to do this. If the original oil looked and felt good,

you could run it for a while. However, oil is cheap. Why not replace it?

Now, put the bike on it's center stand, or in some way lock the rear wheel up and off the ground. Make sure the rear wheel cannot contact the ground. It wouldn't hurt to have a friend hold the front brake on and have their finger on the stop switch, just in case things get out of hand. Start the engine up and see if it will shift through the gears. While it is spinning the rear wheel, oil up the rear chain if it has one. If everything shifts OK, and the brakes and clutch work, you can now buy a battery for it and go for a ride.

If you find the clutch will not disengage, most likely the clutch plates are stuck together. This happens a lot to bikes that have set a long time with the clutch engaged. The oil leaks out from between the plates and they stick together. Sometimes you can break them loose by running in first or second gear, pulling in the clutch and locking up the rear brake. You may have to do this several times. If this doesn't work you will have to take the clutch apart and oil the plates. See the Clutch Page.

Try the brakes. If they are drum brakes, the brake pivot shaft often rusts and this can make them stick. Try oiling the shaft with penetrating oil and working it back and forth. If this doesn't free it up, you will have to take the brake apart. See the Drum Brake Page.

Hydraulic brakes that will not release once they are applied will have to be disassembled, and the gunk that forms behind the caliper piston cleaned out. This gunk tends to lock up the piston. Sometimes, you can work the brake and it will free up for a while. Don't be fooled, you need to take it apart and clean it. Same for the hydraulic clutch. If they don't work at all, check the fluid and add some, of the proper type, if necessary and/or bleed them. See the Hydraulic Brake/Clutch Page.

Old two strokes add a few more problems to the mix. A two stroke must have a sealed crankcase to work. If the crank seals have dried out, they can crack and/or not seal against the crankshaft. This leakage lets air into the fuel mix making everything too lean. If the seal on the power-take-off (PTO) side of the crank leaks, it can let oil from the transmission into the engine making it smoke like crazy. A lot of the older two strokes have the seal on the crank side of the bearing. This means to replace it, you must remove the PTO side bearing. To do that you must completely disassemble the engine. Lots of work. On two stroke twins and triples you must break the crank apart to get to the center seals. Again, lots of work. Some two strokes have reed valves. If one of the reeds is broken or warped or not sealing good, hard starting and/or poor running will be the result. Reeds are usually easy to get to. If the PTO crank seal is on the out side of the PTO bearing, it is easy to get to, too. If it's on the inside, you may be bucks ahead to junk that critter out and look for something else. Sometimes, If you can get it started, and the seal isn't too far gone, just running the engine can rejuvenate the seals. They will slowly start to seal good again. Each time you start it, it will run better and better. So be patient. If things aren't working just perfect, run it gently for a while. It just might heal itself.

Even if the bike has an automatic oil injection system, I like to run a small amount of 20:1 premix for the fuel. This runs everything real rich on the oil. That will help the seals, bearings, and everything. I also like to bleed the injection oil pump. The engine will smoke like mad, and maybe even foul out a spark plug. That's OK. We want lots of oil going into that engine. After running the engine for a few minutes, you can add plain gas to the tank and let the oil injection pump take over. Do this only for two strokes that have an oil injection pump. If the bike has no injection pump, or it has been disconnected,

make sure you use only 20:1 premix for fuel. For some reason, there are a lot of two-strokes out there with good, working, injector oil pumps, that have been disconnected. Go figure. Even with the injector pump set right, I like to see just a bit of smoke coming from my two-strokes. If there is no smoke, bad things are happening. If there is a lot of smoke, like a smoke bomb, the power take off side crank seal may be leaking oil into the engine. I have also noticed that a well worn two-stoke will smoke a lot more than one with a unworn engine. This is probably because the worn engine does not burn the oil/fuel mixture as well as the newer engine.

Some two stroke engines will wet foul their spark plugs. That is, you put in a dry spark plug, try to start the engine, and end up with a spark plug dripping with gas. If the fuel inlet valve leaks or the floats are damaged, raw gas can leak into the crankcase. I've seen some bikes fill up with so much gas that they hydraulically lock the engine up when you try to start them. The cure? Make doubly sure the spark plug is grounded and the ignition is off. Remove the gas tank, seat, and turn the entire motorcycle upside down. After checking again to be sure the ignition is OFF and your fire extinguisher is handy, turn the engine over with the kickstarter. Gas will pour out of the engine so you might want to do this outside and catch the gas with rag. Do this till no more gas comes out of the engine. Wait ten or fifteen minutes, and do it again. Do it till no more gas comes out. Turn the bike right side up, replace everything. If everything else is right, it should start now.

Patience is a virtue, with two and four stroke engines. Make sure there is clean gas and oil. That the ignition timing is correct and that the valves are not too tight. Other than that, LEAVE IT ALONE AND PUT SOME MILES ON IT ! If you try to fix every little thing you think is wrong, you will just end up wasting your money. After three or four hundred miles you will find that many things that where wrong will fix themselves, and that other unforeseen problems may arise. Spend your money on real problems, not on things that will fix themselves. The only exception to this would be the tires and drive chain. If the tires are really bad, with big cracks in them, you will need to replace them. Either that, or get good life insurance, wear a helmet, lot's of leather and go slow ! Same with the rear chain. If it breaks it can lock up the rear end and/or punch a hole in your crankcase. You will just have to use common sense here. Life is full of risks and a bit of a risk is worth taking... just don't get carried away.

Once you get a few hundred miles on the beast, change the oil again and give it a full tune-up, including checking the valve clearance. Check the tires, drive chain, sprockets, stuff like that, too. Spend as little as possible UNTIL you know the bike running right, THEN do it up right.

Top



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